

DETAILED ACTION

Status of Claims

1. In response to the office action mailed on 10/15/07, no amendment to the claims has been made. Currently, Claims 1-22 are pending in the instant application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. **Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

In claim 1 lines 11 and 12, "the fluid transferring means" lack a proper antecedent basis. Furthermore, it is not clear whether the fluid transferring means is being referred to the conduit in line 2.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3, 5-14, and 16-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mace et al. US 4,958,075 in view of Jochum Jr. US 6,813,929 B2.

As to claim 1, Mace discloses a sidestream gas sampling system (figs. 1 and 2), comprising a conduit (50, 118) adapted to communicate a flow of gas to a gas measurement site (at 24); a gas measurement assembly (20) adapted to measure a constituent (CO₂) of the flow of gas at the gas measurement site; and a flow-generating means (30) for generating the flow of gas; Mace however lacks a capillary tube adapted to communicate the flow of gas from the gas measurement site, a differential pressure transducer in fluid communication with a first portion, and a second portion of the capillary tube. However, Jochum Jr. in a fluid flow system teaches a differential pressure transducer/sensors (70b, 78b) in fluid communication with a first portion and a second portion of a capillary tube (64b) (fig.4). Jochum Jr. further teaches a calculating device (86) for calculating a quotient Q based on the reading from the two sensors to calculate a system flow based upon a desired column flow. Jochum Jr. continues to teach a pump controller (88) based on the calculation from the calculating device (86) to regulate the operation of a pump (62b) in order to deliver a required system flow (col.11 lines 47-56 and col.12 lines 5-18). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Mace's tube (122) and pressure transducer (138) respectively with a capillary flow sensing means such as capillary tube (64b) and a differential pressure transducer (70b and 78b) at a first and a second portion of the capillary tube, and further provide the controller with a calculating device (86) as taught by Jochum Jr. for measuring a pressure drop across the capillary with high accuracy (col.8 lines 46-49 of Jochum Jr.). Figure 2 of Mace shows a controller (144, 34, and 146) being coupled to a pressure transducer (138) and a fluid

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transferring means (30). Thus the modified Mace's controller is being able to be coupled to the differential pressure transducer and the fluid transferring means. Mace teaches the controller measures the flow of gas based on the output of the pressure transducer and controls the flow of gas via the flow generating means based on the measured flow (col.8 lines 40-62). Thus the modified Mace's controller is being able to measure the flow of gas based on the output of the differential pressure transducer and control the flow of gas via the flow generating means based on the measured flow.

As to claims 2 and 12, the modified Mace's flow generating means is a pump (30).

As to claims 3 and 14, figure 4 of Jochum Jr. shows the first portion (first transducer 70b) is at the inlet and the second portion (second transducer 78b) is at the outlet of the capillary tube (64b). Thus the modified Mace's system has the first portion is an inlet portion of the capillary tube and the second portion on is an outlet portion of the capillary tube.

As to claim 5, the modified Mace's gas measurement assembly includes an emitter adapted to emit radiant energy through the gas at the gas measurement site and a detector adapted to receive the radiant energy passing through the gas at the gas measurement site (col.2, lines 30-35, and col.5, lines 54-65 of Mace).

As to claim 6, the modified Mace's controller controls the flow generating means in a feedback fashion such that the flow of gas remains constant (see col.9, lines 5-35 of Mace, where the microprocessor controls the vacuum pump to allow a constant flow).

As to claims 7 and 16, the modified Mace's capillary tube communicates the flow of gas from the gas measurement site to ambient atmosphere (see fig.2 of Mace, arrow in tube 130 shows flow of gas to the atmosphere).

As to claims 8 and 17, as discussed in claim 1, Mace's tube (122) is replaced by Jochum's capillary tube (64b). Figure 2 of Mace shows tube (122) communicates between the gas measurement site (24/20) to the flow generating means (30). Thus, the modified Mace's capillary tube communicates the flow of gas from the gas measurement site to the flow generating means (see fig.1).

As to claim 9, the modified Mace's system has a sample cell (see fig.1, 24 of Mace) having an inlet operatively coupled to an end of the conduit to receive gas from the conduit and an outlet operatively coupled to the capillary tube (see fig.1 of Mace), and the sample cell defines the gas measurement site (see col.5, lines 25-53 of Mace).

As to claim 10, the modified Mace's sample cell is detachable from a housing containing the gas measurement assembly, the capillary tube, the flow generating means, and the controller (see col.6, lines 35-37 of Mace).

As to claims 11, 13, and 18, Mace discloses a sidestream gas sampling system in figures 1 and 2, comprising: gas communicating means (118) for communicating a flow of gas to a gas measurement site; gas measuring means (20/24) for measuring a constituent of the flow of gas at the gas measurement site, and a flow generating means (30) for generating the flow of gas. Mace however lacks a flow sensing means for measuring the flow of gas in the gas communicating means substantially independent of a density of the flow of gas. However, Jochum, Jr. teaches the flow sensing means (i.e., a differential pressure transducer/sensor) as applied for claim 1. Mace teaches a controlling means (144, 34, and 146) that measures the flow of gas based on the output of the pressure transducer and controls the flow of gas via the flow generating means based on the measured flow (col.8, lines 40-62). Thus the modified Mace's controlling means

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operatively coupled to the flow sensing means and the flow generating means, for controlling the gas flow generating means based on an output of the flow sensing means (col.8, lines 40-62).

As to claims 19 and 22, the modified Mace's controlling means controls the flow generating means such that a rate of the flow of gas remains constant (the micro controls in Mace's system allows act as a feedback to allow a constant flow, see col.9 lines 5-35 of Mace).

As to claim 20, the modified Mace's gas measuring means includes radiant energy emitting means for emitting radiant energy through gas at the gas measurement site; and detecting means for receiving the radiant energy passing through the gas at the gas measurement site (col.2, lines 30-35, and col.5, lines 54-65 of Mace).

As to claim 21, Mace discloses a method of sidestream respiratory gas analysis comprising communicating a flow of gas to a gas measurement site (20/24), measuring a constituent of the flow of gas at the gas measurement site (using 24). Mace as modified by Jochum Jr. as applied for claims 1 and 10 teaches communicating the flow of gas from the gas measurement site via a capillary tube (64b of Jochum Jr.), a first portion of the capillary tube and a second portion of the capillary tube are spaced sufficiently far apart from one another such that a pressure differential exists therebetween (see fig.4 of Jochum Jr.), measuring the pressure differential with a differential pressure transducer (70b, 78b of Jochum Jr.) in fluid communication with the first portion and the second portion of the capillary tube (see fig.4 of Jochum Jr.). Mace teaches a controlling means (144, 34, and 146) that measures the flow of gas based on the output of the pressure transducer and controls the flow of gas via the flow generating means based on the measured flow (col.8, lines 40-62). Thus the modified Mace's

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controlling means/controller allows controlling the flow of gas based on an output of the differential pressure transducer.

6. Claims 4 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mace et al. US 4,958,075 and Jochum Jr. US 6,813,929 B2 as applied for claims 1, 11, and 13 above, and further in view of Drzewiecki US 6,305,212 B1.

The modified Mace's capillary tube fails to include at least one bend. However, Drzewiecki in a gas analyzing system teaches a bend capillary (16) between a differential pressure sensor (29, 30) positioned at an inlet and an outlet of the bend capillary tube (see fig.5A). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the modified Mace's capillary with a bend as taught by Drzewiecki for measuring fluid flow resistance through the capillary.

Response to Arguments

7. Applicant's arguments with respect to claims 1-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shumaya B. Ali whose telephone number is 571-272-6088. The examiner can normally be reached on M-W-F 8:30am-5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Justine Yu can be reached on 571-272-4835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Shumaya B. Ali /
Examiner, Art Unit 3771

/Justine R Yu/
Supervisory Patent Examiner, Art Unit 3771